AP Calculus AB Sample Test I -- Part B Name: ______________________________

Multiple Choice, Calculator Active Period: _____

In This Test:

1) **Unless otherwise specified, the domain of a function *f* is assumed to be the set of all real numbers *x* for which *f*(*x*) is a real number.**
2) **The <u>exact</u> numerical value of the correct answer does not always appear among the choices given. When this happens, select from among the choices, the number that <u>best approximates</u> the exact numerical value.**

26. The volume of the solid formed by revolving the region bounded by the graph of $y=\left(x-3\right)^2$ and the coordinate axes about the <u>*x – axis*</u> is given by which of the following integrals?

a. $\pi\int_0^3\left(x-3\right)^2 dx$ b. $\pi\int_0^3\left(x-3\right)^4 dx$

c. $2\pi\int_0^3\left(x-3\right)^2 dx$ d. $2\pi\int_0^3 x\left(x-3\right)^2 dx$

e. $2\pi\int_0^3 x\left(x-3\right)^4 dx$

27. The $\lim\limits_{x\to -3}\dfrac{x^2+3x}{\sqrt{x^2+6x+9}}$ is

a. –3 b. –1 c. 1 d. 3 e. nonexistent

28. For $n\neq 1$, $\int_b^c x^n dx =$

a. $\dfrac{c^{n+1}+b^{n+1}}{n+1}$ b. $\dfrac{c^{n-1}-b^{n-1}}{n-1}$ c. $n\left(c-b\right)^{n-1}$

d. $\dfrac{c^{n+1}-b^{n+1}}{n+1}$ e. $x^c - x^b$

29. Let *T* be a trapezoidal rule approximation to $S=\int_a^b\left(3x-x^3\right)dx$. Which of the following statements must be true?

I. If $a < b < 0$, then $T > S$.

II. If $a < 0 < b$, then $T = S$.

III. If $0 < a < b$, then $T < S$.

a. I only b. II only c. III only

d. I and III only e. I, II, and III

30. Let *f* and *g* be differentiable functions such that

$f(1)=4,\ g(1)=3,\ f'(3)=-5$

$f'(1)=-4,\ g'(1)=-3,\ g'(3)=2$

If $h(x)=f(g(x))$, then $h'(1)=$

a. –9 b. 15 c. 0 d. –5 e. –12

31. For which value of *a* could L'Hôpital's Rule be used to find $\lim\limits_{x\to a}\dfrac{\cos\left(3x\right)}{\sin\left(2x\right)}$?

a. 0 b. $\dfrac{\pi}{6}$ c. $\dfrac{\pi}{4}$ d. $\dfrac{\pi}{3}$ e. $\dfrac{\pi}{2}$

32. The shortest distance from the curve *xy* = 4 to the origin is

a. 2 b. 4 c. $\sqrt{2}$ d. $2\sqrt{2}$ e. $\dfrac{1}{2}\sqrt{2}$

33. If $f(x)=3x^2-8x^{-2}$, then $\lim\limits_{h\to 0}\dfrac{f(2+h)-f(2)}{h}=$

a. 10 b. 14 c. 20 d. –14 e. –20

34. How many real solutions does the equation $\sin(6x)=2e^x$ have?

a. None b. 1 c. 6

d. 8 e. Infinitely many

35. The area of the region enclosed by the graphs of $y=e^{\left(x^2\right)}-2$ and $y=\sqrt{4-x^2}$ is

a. 2.525 b. 4.049 c. 4.328 d. 5.050 e. 6.289

36. If $f(x)=|(x^2-12)(x^2+4)|$, how many numbers in the interval $-2\le x\le 3$ satisfy the conclusion of the Mean Value Theorem?

a. None b. One c. Two d. Three e. Four

37. If *f* and *g* are differentiable functions, then $\int_0^{g(x)} f'(t)dt=$

a. $f\left(g\left(x\right)\right)$ b. $g\left(f\left(x\right)\right)$

c. $g\left(f\left(x\right)\right)-g\left(f\left(0\right)\right)$ d. $f\left(g\left(x\right)\right)-f\left(0\right)$

e. $f\left(g\left(x\right)\right)-f\left(g\left(0\right)\right)$

38. If $f'(x) = e^x + \sin x$, then $f(x)$ may be

a. $\dfrac{e^{x+1}}{x+1} + \cos x$ b. $e^x + \cos x$ c. $e^x - \cos x - 1$

d. $xe^{-x} + \cos x$ e. $e^{2x} - \cos x$

39. Let $f(x)$ be a differentiable function defined only on the interval $-2 \le x \le 10$. The table below gives the value of $f(x)$ and its derivative $f'(x)$ at several points of the domain.

x	-2	0	2	4	6	8	10
$f(x)$	26	27	26	23	18	11	2
$f'(x)$	1	0	-1	-2	-3	-4	-5

The line tangent to the graph of $f(x)$ and parallel to the segment between the endpoints intersects the y – axis at the point:

a. (0,27) b. (0,28) c. (0,31) d. (0,36) e. (0,43)

40. A population grows according to the equation $P(t) = 6000 - 5500e^{-0.159t}$ for $t \ge 0$. This population will approach a limiting value as time goes on. During which year will the population reach <u>half</u> of this limiting value?

a. second b. third c. fourth

d. eighth e. twenty-ninth

26. B
27. E
28. D
29. D
30. B
31. E
32. D
33. B
34. E
35. D
36. D
37. D
38. C
39. C
40. B